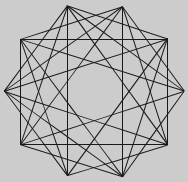

P A D C O

Rebuilding Shelter after Natural Disasters: Three Decades of USAID Experience in Latin America and the Caribbean

Prepared for

United States Agency for International Development

Prepared by

Barbara E. Friday
PADCO, Inc.

Contract No. PCE-I-00-96-00008-00
Delivery Order Number 3

April 1999

PLANNING AND DEVELOPMENT COLLABORATIVE INTERNATIONAL

Development Solutions for the 21st Century

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Executive Summary

> Poverty is the primary root of vulnerability to natural hazards in developing countries. (Berke, Beatley)

The objective of this report is to support USAID's efforts in responding to Hurricanes Mitch and Georges, as well as to future disaster responses. The task was to research and analyze past experiences of the USAID Urban Programs Office in natural disaster preparedness/response in Latin American and the Caribbean (LAC) focusing on the shelter sector. The focus of the research is primarily on the reconstruction process and how it affects the shelter sector. Since many decisions made during relief have a significant impact on how reconstruction unfolds, aspects of the relief process are also included. This report examines the response to 10 of many natural disasters that have struck the LAC region over the past 30 years.

The paper is programmatic in focus. Based on prior experiences of what has worked and what has not worked, it offers concrete lessons learned, recommends ways to analyze the environment in which reconstruction takes place, and suggests how to work with the multiple actors who take part in the reconstruction process.

After a natural disaster, we often ask ourselves why so many people die. One of the main reasons is poverty. In every major disaster, the poor disproportionately suffer the highest tolls of death and injury, destruction of property, and loss of economic means of support. Most deaths and injuries resulting from natural disasters are almost completely avoidable. We know how and where to build homes and structures to avoid fatalities, injuries, and destruction of property. Unfortunately, the poor do not possess this knowledge, share this understanding, benefit from a social safety net, or enjoy the opportunities of choice.

People die, are injured, or lose their homes in disasters because they continue to build and live in unsafe structures and in vulnerable locations, and they do so because these are the most rational options available to them. An important role for the international community is to work with local governments, the private sector, and civil society to create a menu of shelter options that are safe, affordable, and accessible, and that can provide the foundations for continuous improvement.

Solutions to these problems are not easy. Safe housing is expensive, if for no other reason than that there are a great number of poor people. Because resource requirements are so great, and their supply is limited, the most successful approach is one that effectively leverages the combined resources of many actors. Solutions are possible only through the collaboration of government, the private sector, and civil society.

There are many lessons to be learned from prior experiences. What follows are lessons from the past as well as recommendations and guidelines for the future.

Types of Natural Disasters

- *Disasters differ*. Earthquakes differ from floods, and floods from hurricanes or volcanoes. Earthquakes cause a greater numbers of deaths and injuries than hurricanes, but hurricanes and earthquakes can leave comparable numbers of people homeless.
- *Responses vary, depending on circumstances.* While there are lessons that can be gleaned from analyzing a variety of prior disasters and their responses, it is important to realize that yesterday's disaster will not provide the perfect blueprint for tomorrow's response.
- *Countries should prepare for the types of disaster most likely to occur, learning from past experiences.*

What to Do during Emergency and Relief

- *Understand the meaning of shelter.* The definition of shelter is more complicated than that of a physical structure. If we are to provide an appropriate response, we need to understand these complexities.
- *Recognize that people rebuild immediately.* The need to rebuild is immediate, and people begin to rebuild their homes usually within the first 24–48 hours following a disaster.
- *Comprehend what else is going on.* Permanent shelter might not be a family's highest or most immediate priority. Restoration of an economic means of support is usually the most important objective.
- *Don't destroy the good in search of the perfect.* In the rush to rebuild homes, trucks often move in to remove and haul rubble, in the process destroying valuable, reusable materials.
- *Avoid temporary shelter solutions.* They are expensive, create dependencies, and represent a less-than-optimal use of donor funds.
- *Go quickly to reconstruction planning and implementation.* Victims will take care of their immediate, temporary shelter needs. In the long run, victims are better off if donors apply their limited resources to longer-term solutions.

How to Approach the Reconstruction Phase

- *Anticipate that resources will be late arriving.* In contrast to the rapid nature of relief funding and assistance, it is not uncommon for reconstruction resources to take six months or more to materialize.
- *Plan how to use the resources.* If housing needs have been met, late-arriving reconstruction funding can support other related shelter objectives.
- *Understand local dynamics.* Quite often, local officials and professionals identify more easily with donor representatives than with the majority of disaster victims in their own country.
- *Put a strong project management team in place and establish controls from the start.* Evaluations of four projects cited the importance of controls and success of using concurrent audits.
- *Address corruption early on.* As unprecedented amounts of money flow into a country, the normal rules of the game are often suspended. This combination can open the door for all sorts of problems.

- *Support donor and agency coordination.* Ideally, coordination is handled by the national government; however, the presence of large numbers of relief and reconstruction workers can overwhelm the best intentions.
- *Work through the non-profit sector and NGOs.* Non-profit organizations can provide valuable insights, knowledge, and capabilities to outside donors, and they can use the reconstruction experience to deepen their own abilities.
- *Use the local private sector.* Reconstruction provides many opportunities for local architects, engineers, construction firms, city planners, entrepreneurs, bankers, and a host of other professionals to develop skills needed for sustainable development.
- *Don't confuse reconstruction with relief.* A solid reconstruction program recognizes that, while the resources of the poor may be limited, they should not be treated as if they had no resources at all.
- *Avoid charity.* Free aid is counterproductive. It leads to dependency and raises false expectations.
- *Use self-help and community development methodologies.* Local craftsmen can gain both employment and increased knowledge and experience in constructing wind-resistant and seismic-resistant shelter solutions.
- *Use a bottom-up approach.* Working through community-based organizations enables beneficiaries to participate in a reconstruction process that is responsive to their needs.

With Regard to Shelter

- *Use appropriate materials and technology.* Minor changes in building practices can make a big difference as to whether a house remains standing. For the Caribbean, there are three basic rules: use the right gauge roof, use hurricane straps, and make sure walls are tied to the foundation.
- *Facilitate more equitable access to housing finance.* The housing finance market in Latin America is underdeveloped and inadequate. Project funds should be available for construction financing from the start in an emergency housing program.
- *Provide home improvement loans that have a mitigation focus.* Incorporate a mitigation focus into home improvement loans.

Reconstruction and Sustainable Development

- *Foster a dynamic urban planning process.* The quality of reconstruction will depend a great deal on predisaster planning. If a city or municipal development plan exists, then local officials and international donors will have something to work with.
- *Make disaster plans relevant.* Despite the frequency of disasters, planning for them remains inadequate. At best, disaster plans focus on immediate concerns and ignore the longer term.
- *Incorporate disaster mitigation into the reconstruction program.* Disasters take their toll. The question is whether costs are incurred before or after the disaster. Mitigation involves structural design as well as public policy, risk management, and planning. At the household level, mitigation means educating people as to why their houses were destroyed, and where or how they could be rebuilt to reduce that risk in the future. At the community or municipal level, disaster mitigation and prevention efforts should be an integral part of an urban planning process.

- *Help create a "culture of safety."* Public safety and disaster mitigation work only if people understand the issues. To be successful, such programs require significant public information campaigns.

Reconstruction and Economic Development

- *Seek change while memories are fresh.* Disaster mitigation and economic development are inextricably linked. Disaster mitigation should be part of the reconstruction process. However, willingness to make changes that will improve public safety will diminish the more distant the memory of the disaster becomes.
- *Use the reconstruction process to build local institutional capacity.* Reconstruction provides almost unprecedented opportunities for local agencies, organizations, and institutions to gain valuable experience. This includes the government, the NGO community, the formal private sector, and grassroots organizations.
- *Use the reconstruction process and accompanying resources to jump start economic development.* The influx of capital into a healthy system, even post-disaster, will accelerate growth.
- *Be realistic.* In a closed or corrupt system, the influx of capital can exacerbate pre-existing unhealthy conditions.
- *The cost of reconstruction will far exceed total donor contributions.* The total costs of reconstruction can be more than 10 times what the donor community provides. This means that scarce national resources that could otherwise be spent for development purposes will be used for reconstruction.

Information Dissemination

- *Maintain a library of past experiences and a database of experts.*
- *Disseminate knowledge to overseas officers.*
- *Convene regular meetings on disaster mitigation and reconstruction.*

Rebuilding after Natural Disasters in the Shelter and Municipal Sectors: Three Decades of USAID Experience in Latin America and the Caribbean

1 Introduction

1.1 Objective, Scope, and Methodology

The objective of the research found in this report is to support USAID's efforts in responding to Hurricanes Mitch and Georges, as well as to future disaster responses. The task was to research and analyze past experiences of the USAID Urban Programs Office in natural disaster preparedness/response, particularly in Latin American and the Caribbean and in the shelter/municipal sectors. Research for this project was carried out in Washington, DC between March 12 and April 2, 1999.

The focus of the research is primarily on the reconstruction process and how it affects the shelter and municipal sectors. Since many decisions made during relief have a significant impact on how reconstruction unfolds, aspects of the relief process are also included. While the examples in the report come from experiences of the past, the lessons and recommendations are geared for future responses.

As part of the present exercise, PADCO reviewed a large and representative sample of USAID's experiences in responding to natural disasters. For the events selected for investigation, we reviewed a variety of relevant documents, including loan documents, final reports, project audits, and evaluations. At the same time, we conducted telephone interviews with eight persons associated with the events in question, who have broad experience in disaster response and reconstruction in the shelter and municipal sectors.

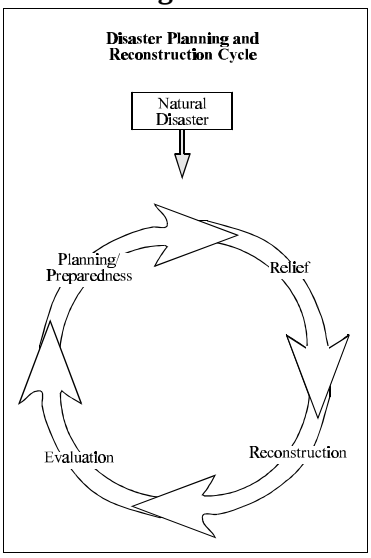
From that data, we drew the major lessons learned, across country and event. We sought to provide concrete lessons on ways to analyze the environment in which reconstruction takes place, how to work with various actors, how to build sustainable development into reconstruction, etc. Finally, to the extent possible within the time allocated, we provide a cross-country data comparison.[1]

[1]The author was unable to perform a comprehensive cross-country or cross-disaster analysis of financial data, including the levels and nature of USAID programming in the shelter sector. This was due to the fact that information included in the documentation that was reviewed was reported in different ways by different authors. Often, the numbers are "apples and oranges," and it was impossible to compare basic statistics in any way that is useful or meaningful. This is not an impossible task — but it requires access to consistent reporting data. The author reviewed more than 40 documents — loan documents, final reports, audits, evaluations, etc. — but unfortunately not all of the above for all of the disasters. A comprehensive cross-country comparison would require access to and review of like documents with similar reporting requirements.

"Lessons learned" are organized following the disaster planning and response cycle shown in Figure 1. This cycle shows that a natural disaster is generally followed by four overlapping phases:

- *a relief phase* — survivors and relief workers are concerned about immediate survival issues;
- *a reconstruction phase* — government and international organizations are able to mobilize the bulk of their assistance;
- *an evaluation phase* — agencies can draw the "lessons learned" from the disaster response; and
- *a planning and preparation phase* — organizations can plan for an improved response to future natural disasters.

Figure 1



We hasten to point out that: (1) this cycle can be drawn in different ways and (2) the phases are overlapping. Experts have proposed a variety of ways to construct the natural disaster planning and response cycle; all have their advantages and defects (see Section 3.2, below). Figure 1 does attempt to show that phases cannot be clearly delineated, as survivors and officials progressively move from immediate to long-term considerations. Regardless of the details of a particular model, the general concept of a planning and response cycle has some utility (as well as some disadvantages). This concept undeniably underlies the way international organizations provide assistance after natural disasters; relevant lessons learned are discussed in Section 3.2, below.

1.2 Background and Context

Following every natural disaster, after we've seen all the horrific television clips and newspaper photographs, we often ask ourselves why so many people die.

One of the main reasons is poverty. In every major disaster, the poor disproportionately suffer the highest tolls of death and injury, destruction of property, and loss of economic means of support. Almost all deaths and injuries resulting from natural disasters are avoidable. We know how and where to build homes and structures to avoid fatalities, injuries, and destruction of property. So, if we know this, why do so many people — most often the poor — die? And why do so many others remain homeless? They do so because the poor do not possess this knowledge, share this understanding, benefit from a social safety net, or enjoy the opportunities of choice. What is lacking is not technical know-how on how to build a safer home, but rather access to it.

People die, are injured, or lose their homes in disasters because they continue to build and live in unsafe structures and in vulnerable locations, and they do so because these are the most rational options available to them. An important role for the international community is to work with local governments, the private sector, and civil society to create a menu of shelter options that are safe, affordable, and accessible, and that can provide the foundations for continuous improvement. This can best be achieved through mobilizing resources, promoting partnerships, and encouraging change that will offer more opportunities to more people.

But the solutions are not easy. Safe housing is expensive, in for no other reason than the fact that there are a great many poor people. Who will pay? How much? There will always be trade-offs — how many people benefit vs. how simple or sophisticated the solution. And there will be debates — does post-disaster assistance replace what was lost with a disaster-resistant version of the same, or does it lay the foundations for a better future? Should we focus on relief and temporary shelter, or concentrate on the longer term? How can we most effectively use our limited development resources?

Because resource requirements are so great, and their supply is limited, the most successful approach is one that effectively leverages the combined resources of many actors. Government alone cannot resolve all shelter issues for the poor because it lacks sufficient human, technical, institutional, and financial resources to do so. Solutions are possible only through the collaboration of government, the private sector, and civil society.

This report discusses lessons learned from many types of disasters and how we can apply those lessons to assist the poor, particularly in the post-relief/reconstruction stage of the disaster cycle. A second focus is to examine how disaster-related resources that are used during reconstruction can and should be leveraged to support sustainable development. In other words, how can responses to disasters stimulate, promote, and lay the foundations for a better and safer future? Such changes include both those that will improve the lives of the poor long after the current relief workers depart and those that will mitigate against the potential damage of future disasters.

2 Magnitude of Disasters and Summaries of Responses

2.1 Events Surveyed

Latin American and the Caribbean (LAC) is particularly susceptible to natural disasters. Over the last three decades, LAC has been hit by at least 19 major natural disasters — about one every year and a half. As shown in Table 1 on the following page, those natural disasters include hurricanes (nine), earthquakes (seven), and other (floods, volcanos, and mudflows: three).

USAID, including the Office of Urban Programs, has played an important role in responding to virtually all of these natural disasters. Rebuilding after those disasters requires drastic changes in the way USAID normally does business, and yet the frequency of those events means that rebuilding after disasters **is** in some sense a normal part of USAID's work. Both the frequency of natural disasters and the ongoing importance of the Office of Urban Programs in post-disaster response justify the present review of "lessons learned."

As part of the present exercise, PADCO surveyed USAID's responses to a full half of the natural disasters listed in Table 1.[2] The 10 events selected for analysis[3] were chosen on the basis of

[2]See items with asterisks (*) in Table 1. Summaries of these individual responses are provided in Appendix A; lessons learned across country and event are provided below.

[3]In addition to nine natural disasters, per request of G/ENV/UP, PADCO also reviewed USAID's response after the 1989 U.S. military operation in Panama. Rebuilding after a conflict shares some similarities with reconstruction after a natural disaster.

representativeness. To understand trends over time, half of the responses reviewed took place in the 1970s, while the other half occurred in 1980s. Furthermore, the 10 events surveyed included both earthquakes (five) and hurricanes (four), as well as one reconstruction following a U.S. military operation. The natural disasters that triggered the international response were generally massive, often causing thousands of deaths and leaving hundreds of thousands of persons homeless (see Table 2). Finally, as shown in Table 2, the events surveyed involved both urban and rural impacts.

Table 1
Matrix of Major Natural Disasters
LAC Region — 1970–1999

Year	Event Type	Countries/Region	Name
*1970	Earthquake	Peru	
*1972	Earthquake	Nicaragua	
1975	Hurricane	Honduras	Fifi
*1976	Earthquake	Guatemala	
*1979	Hurricane	Dominican Republic	Frederick
*1979	Hurricane	Dominican Republic	David
1980	Hurricane	Barbados, St. Lucia, St. Vincent	Allen
1983	Floods	Peru	
*1983	Earthquake	Colombia	
1985	Mudflow	Colombia	
*1986	Earthquake	El Salvador	
*1988	Hurricane	Jamaica, Haiti	Gilbert
1988	Hurricane	Nicaragua	
*1989	Hurricane	St. Kitts/Nevis, Antigua, Montserrat, Dominica	Hugo
1994	Earthquake	Colombia	
1998	Hurricane	Dominican Republic, rest of Caribbean	Georges
1998	Hurricane	Central America	Mitch
1998	Volcano	Montserrat	
1999	Earthquake	Colombia	

Note: Asterisk (*) indicates USAID response was reviewed for the present report. Also reviewed for the present report was reconstruction after the 1989 U.S. military event in Panama.

Table 2
Magnitude of Major LAC Disasters Surveyed

Type	Country	Name	Date	Time	Killed	Injured	Homeless	Homes Damaged/ Destroyed	Location
Earthquake	Peru		5-May-70		47,000	100,000	500,000	160,000	rural
	Nicaragua		24-Dec-72	11pm	10,000	20,000	200,000	50,000	urban
	Guatemala		4-Feb-76	3am	23,000	76,000	1,200,000	278,000	rural
	Colombia		31-Mar-83	8:13am				14,000	urban and rural
	El Salvador		10-Oct-86	11:49am	1,500	20,000	300,000	32,000	urban
Hurricane	Dominican Republic	Frederick and David	Aug-78		2,000		250,000		rural and urban
	Jamaica, Haiti	Gilbert	12-Sep-88		100		1,680,000		rural and urban
	St. Kitts/Nevis, Antigua, Montserrat	Hugo	16-Sep-89		21		50,000		rural and urban
Military Event	Panama		20-Dec-89	midnight			10,000	2,724	urban

2.2 Importance of Shelter and Urban Infrastructure in Reconstruction

When reconstructing after natural disasters, housing and urban infrastructure represent important priorities and a third of reconstructioin investment by all donors (not just USAID). For 20 representative disasters studied by Krimgold, Kellenberg, and Boardman, housing consistently represents between a fifth and a third of reconstruction investment by donors. This importance varies somewhat, depending on the type of natural disaster. As shown in Figure 2 on the following page, housing typically represented nearly half (45 percent) of reconstruction resources after an earthquake and less for response after floods (34 percent) and wind-related disasters (31 percent).

Infrastructure likewise represents an important sector for reconstruction. While data do not always permit a clear distinction of municipal or urban infrastructure from other types of facilities, it is clear that, following earthquakes, urban infrastructure typically accounts for 23 percent of donors' reconstruction resources (see Figure 2).

Table 3 provides a breakdown of reconstruction expenditures by donors within the building and infrastructure sectors. Housing uses the majority of post-disaster building construction funds. In the infrastructure sector, urban infrastructure represents the most important subsector, followed closely by power and transportation.

Figure 2

(hard copy only)

Table 3
Investment in Buildings and Infrastructure Following Disasters

Buildings	**55%**
Housing	39%
Educational Facilities	9%
Health Facilities	4%
Emergency Shelter	3%
Infrastructure	**45%**
Urban	14%
Power	11%
Transportation	8%
Water/Sewage	6%
Rural/Agriculture	5%
Total	**100%**

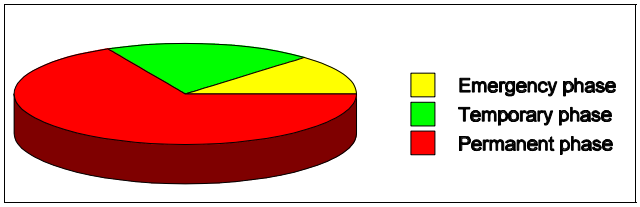
Finally, Figure 3 shows that, in the shelter sector, most donor resources support the "permanent" phase of reconstruction. For all types of natural disaster surveyed, between one-half and three-fourths of donor resources used for shelter reconstruction go to permanent shelter solutions. Temporary solutions account for between a fifth and a third of resources, with the remainder going toward emergency response.

The quantity of donor resources used to rebuild shelter and local infrastructure underlines the importance of capturing lessons from past experiences in those sectors. Key lessons are presented below.

Figure 3
Shelter Sector Expenditures by Phase and Disaster Type

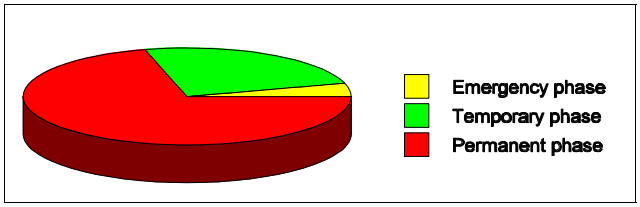
For earthquakes, where 70% of donor expenditure was shelter-related, the distribution by phase was:

Emergency phase	9%
Temporary phase	14%
Permanent phase	47%



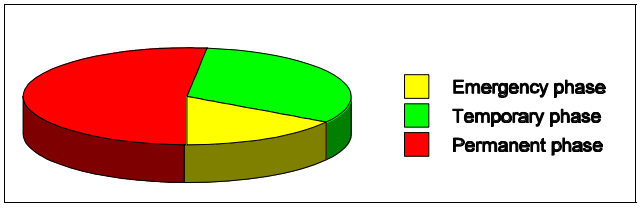
For floods, where 63% of total donor expenditure was shelter-related:

Emergency phase	3%
Temporary phase	15%
Permanent phase	43%



For wind-related disasters, where 49% of total donor expenditure was shelter-related:

Emergency phase	8%
Temporary phase	15.5%
Permanent phase	25%



Source: *Krimgold, Kellenberg, Boardman, "Donor Expenditures for Disaster Relief, Recovery and Reconstruction in the Shelter Sector," 1992.*

3 Lessons Learned

3.1 Types of Natural Disasters

In many ways, events that fall under the rubric of "natural disasters" are as different from one another as they are similar. They all produce death, injury, and devastation to people, animals, and physical property. But the nature of the damage and the appropriate shelter response vary widely.

Disasters differ — earthquakes are different from floods, and floods from hurricanes and volcanoes.

Earthquakes cause a greater numbers of deaths and injuries than hurricanes, but hurricanes and earthquakes can leave comparable numbers of people homeless. The figures shown in Table 4 are illustrative.

Table 4
Persons Affected by Natural Disasters

Type of Event	Location, Year	Killed	Homeless
Earthquakes	Nicaragua, 1972	10,000	200,000
	Guatemala, 1976	23,000	1,200,000
Hurricanes	Frederick/David, 1979	2,000	250,000
	Gilbert, 1988	100	1,680,000
	Hugo, 1989	21	50,000

Earthquakes kill and injure mainly due to lack of warning. While it is true that many people live along fault lines, the precise moment and sudden jolt of a quake usually come as a surprise, and, while a given town or city may experience minor tremors or low-intensity quakes, a serious earthquake might happen in a particular location only once in 50 or 100 years.

Hurricanes, on the other hand, are predictable. They give advance warnings and usually allow people time to move into shelters and protect at least some of their possessions. While the high winds and water of a hurricane might cause widespread damage and destruction to housing and basic infrastructure, there are far fewer fatalities and injuries than in earthquakes.

Next to lack of warning, improper and inadequate construction are the second reason why people die, are injured, or lose their homes. In earthquakes, concrete office and apartment buildings collapse in cities, while in the countryside, adobe homes crumble, bringing down heavy tile roofs on sleeping victims. In hurricanes, inadequate construction explains why so many homes are lost.

Hurricanes of the magnitude of Hurricane Mitch are an infrequent occurrence, affecting a given local perhaps once every 500 years. The amount of rain that fell over populated areas in Central America

in October 1998, combined with improper siting, faulty construction, and unprecedented levels of deforestation, produced particularly devastating results.

A natural disaster's impact depends on its location. A major hurricane that occurs far offshore will cause less damage than a milder storm that strikes a densely populated area. Similarly, a disaster's impact, and the nature of an appropriate shelter response, will differ between rural and urban areas.

Responses vary, depending on circumstances.

After an earthquake, the first priority is to tend to the dead and wounded. Housing is a secondary issue. Many of those who would do the rebuilding have been killed or are seriously injured. In the aftermath of a storm, however, housing and the restoration of basic infrastructure are high priorities.

In urban areas, where populations are highly concentrated, shelter solutions will differ from those in rural areas, where farmers often live in scattered settlements. A homeless urban population might need to be relocated, but to where? In rural areas, people will likely rebuild near where they lived.

Responses must be measured in terms of a country's needs. A country that enjoys a growing and educated middle class will have different requirements from one whose population is largely illiterate and unskilled. Argentina or Chile will not have the same needs as Central America or the Caribbean. A country in which local capacity is more developed might require only financial assistance, whereas a small nation might need both financial support and technical assistance.

Responses must be evaluated in terms of the victims' needs. The disaster's impact on economic activity is an important variable. Will people be able to go back to work or did the disaster wipe out their economic livelihood? How jobs are affected will most certainly shape a population's priorities, as will its ability to pay for reconstructed homes.

The role of USAID will differ considerably depending on the type of disaster, whether it is rural or urban, and the level of a country's development. While there are lessons that can be gleaned from analyzing a variety of prior disasters and their responses, it is important to realize that yesterday's disaster will not provide the perfect blueprint for tomorrow's response.

3.2 The Phases of Disaster Response

> The arbitrary administrative subdivision, by intervenors, of post-disaster housing activities into "emergency," "temporary" and "permanent" phases obscures an understanding of housing as a process…. It is essential to view "shelter" or "housing" as a process, not simply a structure. In order to understand that process, and to evaluate true success or failure, the process must be viewed from the standpoint of the victims who are affected by the shelter program. (Cuny, Davis, Krimgold)

Much has been written about the stages of post-disaster responses. In addition to the terms used in the quotation above, the stages are also described as relief, reconstruction, recovery, and rehabilitation. Some use the words emergency, restoration, replacement, and development (Haas,

Kates and Bowden). We used another description of stages in Figure 1, above (page 2). Stages are defined by the activities carried out as well as by their duration.

Some of the literature notes that these definitions are useful primarily to donor agencies and outside providers of assistance, because their mandates are defined accordingly. The literature further maintains that these divisions of responsibility have programmatic consequences that do not necessarily work in the best interest of the victims. For example, the efforts carried out by relief agencies set the stage for reconstruction and, at times, their actions can make the reconstruction process even more difficult. On the other hand, when the development agencies step in, they often miss opportunities that could mitigate relief requirements of the future. The disaster process is circular and caught in the middle are the needs of the victims.

Others say these terms obscure what is really going on. They note that stages are not "ordered, knowable [or] predictable," nor are they uniformly sequential. In fact, what happens at any given "stage" will depend mainly on "which political, economic, or other group one is a member of and the geographical location or local community in which one lives" (Berke, Beatley). These authors explain that in Jamaica, following Hurricane Gilbert, factors that significantly affected the allocation of resources, such as roofing material, for example, differed depending on one's individual or one's community's political party affiliation at the national level.

Berke and Beatley caution that we "need to substantially rethink the ways we conceptualize the recovery process and the ways we view the stages and sequence on recovery and reconstruction. Findings from Hurricanes Hugo and Gilbert suggest that traditional thinking about this may lead to inappropriate public policy responses."

Their words resonate because decisions made by agencies and organizations responsible for initial response can have serious implications — positive or negative — on the efforts of those that follow and, most importantly, on the ultimate beneficiaries of assistance.

If the relief stage is characterized by anything, it is that of speed. Speed is both a blessing and a curse. Life-saving operations must be carried out rapidly; of that there is no question. But other donor efforts, particularly those related to shelter and housing, do not need to proceed so quickly. They can, and should, be given careful thought. Minimal donor support in the shelter sector during relief can be more helpful to the recipient than a massive, hurried response, and it can be a wiser use of donor shelter resources. Emergency responses are expensive. Money saved up front can be applied to permanent and safer shelter reconstruction later on.

What often happens, unfortunately, is that well-intended decisions made in haste during "relief" can negatively affect the shelter reconstruction efforts that follow. This includes placing people in sites for temporary shelter that would better serve permanent shelter needs, placing people in sites that cannot be maintained, and relocating people to places from which they are unwilling to move at a later date. It even includes the decision of whether or not to place people in temporary shelters or to let them determine their immediate needs on their own, with minimal outside assistance.

If providing shelter is a priority, then it must be viewed as a process whose planning, construction, and ongoing improvement will take place over a continuum — one that begins at some point after the disaster and that will continue for many years as people improve and add to their homes or acquire new properties.

3.3 Immediate Emergency Response and Relief Phases

Understand the meaning of shelter.

Part of the rush to provide shelter is due to a misunderstanding of what it really represents. The definition of shelter is more complicated than "physical structure." If we are to provide an appropriate response, we need to understand these complexities.

Most donors and many local officials misunderstand the primary function of emergency shelter which is "… not protection from climatic exposure … but rather … storage and protection of property, reestablishing physical orientation, provision of a staging point for future action, emotional security, provision of a framework for social reorganization, [and] provision of a starting point for salvage and reconstruction" (Cuny, Davis, Krimgold).

Recognize that people rebuild immediately.

The need to rebuild is immediate, and people begin to rebuild their homes usually within the first 24–48 hours following the disaster. The literature suggests that if outside emergency shelters are to serve emergency needs, they must be available within the first week. If they are not, families will find their own alternative solutions.

As noted by Cuny, Davis, and Krimgold (and many others) "… in the vast majority of cases where international relief agencies have attempted to supply an 'emergency shelter unit,' the units have arrived long after the emergency has passed."

Appreciate human needs.

In describing the behavior of earthquake victims, Gersony makes several important points.

> Although they are homeless, disaster victims will attempt to remain as close as possible to their home site, especially at the outset. They will seek to recover and properly bury family members and others buried in the rubble. They will seek to recover documents, cash, valuables … and other possessions and potential shelter materials. They will be anxious to safeguard any legal claims or rights which they have or which they believe may devolve upon them as residents of their collapsed building.

Comprehend what else is going on.

Well-intended outside assistance can inadvertently disrupt social relationships. Cuny, Davis, and Krimgold note that a major problem confronting any intervenor is how to identify the coping mechanisms that exist in the society and how to relate outside help to those built in disaster response

systems. Others warn that programs that give away too much too soon can disrupt coping patterns within families.

Permanent shelter might not be a family's highest or immediate priority. Restoration of one's economic means of support is usually the most important objective. The literature warns that a rural self-help housing program will have little success if it is planned to take place during certain parts of the agricultural cycle.

Don't destroy the good in search of the perfect.

In the rush to rebuild homes, trucks often move in to remove and haul rubble. In the haste to accomplish this objective, valuable items are often damaged, destroyed, or simply rendered useless. This includes personal items and important papers, as well as potential rebuilding materials.

> Rapid, mechanized clearance activities hinder, rather than help reconstruction … [They] destroy salvageable materials … that could be re-used … Often those responsible for … the bulldozing operations do not realize the immense value in the materials [that] are being removed or destroyed. For example, in a home made of adobe, virtually every bit of material in the destroyed house can be reused … Broken adobes can be pulverized and reconstituted into new adobes. Wood in the roof can be re-used in a variety of ways, including a new roof, doors and windows … Reinforcing iron, cable, electrical wiring, glass, tiles and tin roofing — all materials [that] are usually destroyed in bulldozing operations — could be salvaged for re-use. (Cuny, Davis, and Krimgold)

Avoid temporary shelter solutions.

- *Temporary shelter solutions are expensive.* "… the relative cost of the temporary solution … is enormous in comparison with permanent solutions. Put toward permanent housing solutions, much of the financing of the temporary shelters could [do] wonders."
- *Temporary shelter solutions create dependencies.* "The provision of shelter for people tended to create the expectation of future free assistance …"
- *Temporary shelter solutions are often inappropriate to the climate.* Materials coming from the U.S. and other donors were inappropriate to the climate. They made the homes hot during the day and cold at night. Some provisions included igloos and tents. There were many complaints and virtually no demand component to the assistance.
- *Temporary shelter solutions ignore cultural realities.* Many temporary shelter sites provided water facilities that were culturally inappropriate. There were numerous cases where latrines were provided and never used in the six years from the date of the earthquake to that of the evaluation.
- *Temporary shelter solutions can pose unsafe social environments.* Some of the shelters were essentially group houses in which non-relatives lived together, causing many complaints and friction.
- *Temporary shelter solutions all too often become permanent.* Many of the temporary shelters evolved to permanent housing with few improvements made to the properties. The layout of "temporary camps" should incorporate the possibility that they will evolve into permanent

settlements; there must consider adequate space per family and a strategy that will discourage seismically vulnerable rowhouses and other patterns.

- *Temporary shelter solutions represent a less-than-optimal use of donor funds.*

The above observations, which can be generalized to other disasters, were made by Paul and Charlotte Thompson in an evaluation of post-disaster housing assistance in Peru (1970 earthquake). Part of the U.S. response to the quake supported a temporary housing program in the highlands. It provided 660 multifamily temporary units, each designed for four families (2,640 individual units) at a cost of $450,000 or $170/unit. Other observations are more particular, but also tell valuable lessons.

- "Temporary shelter … took 3–6 months to provide. During that time, people had long since made provisional arrangements on which the expensive externally provided shelters were often just marginal improvements."
- "About 10% of the buildings were used for non-housing purposes because by the time they were constructed … there was no further demand for those modules."
- "The provision of shelter for people tended to create the expectation of further free assistance, which the Government (and outside cooperating agencies) could not provide. Yet this expectation must have slowed up self-directed efforts."

The cases of Nicaragua and Guatemala are also illustrative. Both involved what seems to be the least-popular temporary shelter option: tents. Ian Davis gives figures comparing the number of tents provided vs. the number used following earthquakes in Nicaragua 1970 and in Yugoslavia in 1963.

Table 5
Tents: Provision and Utilization

Location	Provided (units)	Utilized (approx.)	
		Units	Percentage
Managua, 1972	4,191	1,800	43
Skopje, 1963	14,044	2,000	14
Total	18,235	3,800	21

Probably the most dramatic example of failure was the provision of tents following the Guatemalan earthquake in 1976. Ian Davis, in Gersony, 1981, noted the following.

- In the countryside, "[s]ome regimented camp sites were laid out by the Guatemalan army and the Red Cross, but predictably this was not popular … [In San Martin,] 3,000 tents were set out by the army. After two weeks possibly 7 were occupied, and this despite threats by the army to force people in at gun-point. As with so many disaster situations the people of San Martin needed to be with their animals and household belongings, and a camp-site somewhere outside the town was not convenient for either. 'Expulsion policies' have been equally unsuccessful in such diverse places as Darwin, Australia and Skopje, Yugoslavia and the Bustee Camps in Bangladesh."

- While in Guatemala City, "[a]lthough some affected families found shelter within tents, it would appear that the vast majority of all tents erected were either used by non-deserving families or they were simply not used. The greatest use in Guatemala City was by wealthy families."
- He concludes that "[t]he usage within the large campsites was minimal … large sums of money can be sunk into the bulk of tents. They are almost always of unsuitable design, they are often unimaginatively sited by military or Red Cross personnel on large sites that are totally unattuned to the needs of families. It is significant that these findings on the subject of tents find an echo in the Managua earthquake of 1972 …"

Hopefully, these examples from the 1970s are outdated. The Cooperative Housing Foundation notes that dependence on imported tents and prefabricated buildings can be reduced by using plastic sheeting material in combination with a frame made of indigenous new or salvaged materials. Conversations with specialists reveal that plastic sheeting is not too popular either, but it does hold the advantage of being adaptable to the shape one wishes to give a structure.

Go quickly to reconstruction planning and implementation.

Victims will take care of their immediate, temporary shelter needs. Donor assistance should be minimized and be provided only to the extent that it is necessary for humanitarian reasons. In the long run, victims are better off if donors apply their limited resources toward longer-term solutions.

Ian Davis describes what happened following the 1976 Guatemala earthquake.

> The extraordinary response in Guatemala City, where almost 50,000 temporary homes were improvised within 24 hours, underlines the growing awareness that immediate shelter is a low priority issue for governments or agencies when seen in comparison with other needs. It is far better to focus immediate energy and finance on rapid reconstruction than to waste precious resources on temporary structures, which people are well able to provide for themselves.

3.4 Reconstruction Phase

3.4.1 Timing and Resources

Anticipate that resources will be late arriving.

One constant, regardless of disaster type, location, or circumstance, is that reconstruction resources will take time to mobilize. In contrast to the rapid nature of relief funding and assistance, it is not uncommon for reconstruction resources to take six months or more to materialize. According to Krimgold, Kellenberg, and Boardman, 65 percent of post-disaster shelter sector assistance (of cases they studied) came more than 150 days after the disaster strike date. Such delays are to be expected, especially if the aid package is a special appropriation (which it almost always is) and if the amount is high.

The current case of Hurricane Mitch is typical. The hurricane was pounding Central America and the Dominican Republic on October 28, 1998 — exactly 5 months before the date of this report's preparation. Funding is currently under debate in Congress and may or may not be approved quickly.

And funding is only the first step: the contractual process and provision of financial, technical, and human resources will then take several more weeks, if not months, to put in place.

Plan how to use the resources.

It is likely that funding will arrive long after many housing needs have been met. This, of course, depends on the housing requirements of the target population. If housing needs are satisfied, then reconstruction funding can support other shelter objectives. These include disaster mitigation efforts, which are described in greater detail later in this report. In Jamaica, for example, reconstruction resources were used to establish the disaster mitigation branch of the University of the West Indies.

On the other hand, the planning and construction of complex urban sites, such as that of Las Americas in Nicaragua, can take years to accomplish. Following the 1972 earthquake, U.S. funding made housing finance available to 10,000 families. The careful planning that went into Las Americas might be criticized for delays, but, in the long run, the poor benefited. Through USAID support, low-income families were able to purchase, and later improve, homes in one of five housing sites. Several models were available and families could choose homes based on their preferences and on what they could afford.

3.4.2 Project Management Considerations

Field a strong project management team.

An evaluation of the reconstruction process in El Salvador following the 1986 earthquake found strong project management, and continuity of that management, to be key factors for success in project implementation. The evaluators emphasized the importance of a pro-active management style where "getting out and looking at the project and having trusted personnel in key positions in the implementation process is a far better guarantee of good results than any paper reporting system yet devised." They also recommended that a "project financial manager, working directly with the project manager, is a model worth replicating."

Establish controls from the start.

Four project evaluations cited the importance of controls and the successful use of concurrent audits.

- In El Salvador, with regard to reconstruction following the 1986 earthquake, evaluators concluded that "[t]he experience of this project demonstrates the value of concurrent audits … especially on large, diverse projects with multiple implementing agencies, some of whom may not realize the importance of meeting AID requirements for management of funds."
- A State Department cable concerning the audit of activities in Jamaica following Hurricane Gilbert in 1988 explains, "The concurrent audit mandated by AID/W was most useful … As a result, the Mission was informed early of potential problem areas and made mid-course corrections before they became serious. The lessons learned were: a) the importance of early establishment of reliable tracking/monitoring system which facilitated audit; and b) a concurrent RIG audit is desirable in a high visibility crisis situation."

- The project assistance completion report for the Hurricane Hugo Disaster Rehabilitation Project (1989) says, "concurrent audits are the suitable form of financial monitoring for disaster assistance projects, and other projects of this type."
- During the reconstruction of El Chorrillo in Panama (1990), five auditors were on site throughout implementation of the project. Charles Dean states, "The Caja provided space for the auditors in the public area of the special office which was set up to issue passbooks in Chorrillo. This gave them high visibility to the beneficiaries which increased their confidence that the program was being carefully and fairly managed … The AID Regional Inspector General from Honduras also participated in audits of the projects … as did the GAO."

3.4.3 Partnerships with Different Players

Relief and reconstruction are complicated periods of time, not only because of trauma and devastation, but also because so many actors participate in the process. Each brings its own particular set of priorities and objectives, perceptions of local requirements, and solutions. Participants come from numerous other countries and from international and bilateral donor agencies, international relief and private voluntary organizations, churches, civic organizations, etc. Whether from overseas or from within the particular country, these groups represent government, the private sector, grassroots constituencies, and a wide range of social and economic classes. A challenge for any international participant is to understand the cultural context, what is really going on.

Understand local dynamics.

Societies in developing countries are as complex as our own, and we often misread the signposts. As USAID and other donors collaborate with local representatives, it is important to keep this in mind. What outsiders often fail to recognize is that many local government officials, private sector professionals, and even grassroots NGOs may identify more easily with representatives from the donor countries than with the majority of disaster victims in their own.

Berke and Beatley observe:

> Studies of an earthquake-devastated city in Peru (Oliver-Smith 1990; Oliver-Smith and Goldman 1998) point to rigid social stratification and the resultant inequalities in community power and influence as keys to understanding the timing and outcomes of recovery … [P]owerful interest groups, particularly from the business community and the upper-class elite, were able to take advantage of recovery aid because of their strong predisaster control over local institutions and their ties to central authorities … Poorer neighbors were more likely to have weaker ties … and thus the process of rebuilding was less equitable for them. This also meant that any plans that might change the status quo or influence the distribution of wealth would meet with strong opposition from the community's most powerful and vocal interests. These studies and others … conclude that outside delivery systems (international and domestic) typically do not recognize the inherent conflicts of interest in existing community and social structures.

In his report on the reconstruction of Chorrillo, Panama, following the U.S. military action, Robert Gersony makes observations that apply to all such efforts. He recommends that AID should place a high degree of vigilance on the program, including "care … to avoid conflicts of interest or favoritism … among parties to the agreement and contractors/developers" and independent, open, and competitive bidding.

Support donor and agency coordination.

In disasters where there is high participation from numerous donors and agencies, coordination will be difficult. Ideally, coordination is handled by the national government; however, the presence of large numbers of relief and reconstruction workers can overwhelm the best intentions.

The example of Guatemala (1976 earthquake) illustrates how conflicting ideologies among donors have real and significant consequences for intended beneficiaries. USAID and CARE were both operating in rural Guatemala, but using very different approaches to reconstruction. The debate centered on such terms as "saturation vs. selective coverage" and "materials distribution vs. donations." The USAID approach was to sell, at a discount, housing construction materials to all that were interested in purchasing them, regardless of the damage done to their home. CARE decided to donate materials, selectively, to all that qualified. Qualification was based on inspection and those who lost homes were eligible to receive new ones, while those whose homes suffered minor damage were not.

These programs often operated in adjacent regions, if not within the same *municipio*. As Gersony noted, the unforeseen consequences were many, including the following.

- Because the CARE approach involved selection criteria, the program left itself open for criticism and accusations of favoritism.
- Because the CARE approach required inspection of a damaged home, and only severely damaged homes were eligible, families often destroyed perfectly good homes in order to be able to qualify for the CARE program.
- Probably the most serious consequence was the divisiveness it caused within communities. The very different approaches caused conflicts within families or among neighbors who received different treatment. Some of those who participated in the USAID program resented that they had to pay for the materials to build their home, while those in the CARE program received them for free.

Lessons regarding partnerships with specific actors are discussed below.

3.4.3.1 National Government

Coordinate with government agencies and institutions.

National government agencies become the principal coordinators in many relief efforts. If managed well, the reconstruction process can strengthen the technical and administrative skills of key governmental institutions. Examples follow.

- In Peru, after the 1970 earthquake and 1972 floods, the Housing Bank of Peru became the borrower and Executing Agency for USAID's $15 million loan, as well as the $10 million counterpart contribution. By the end of the program, the bank gained considerable experience in a variety of areas, including financing major utility infrastructure in the Pueblos Jovenes (shantytowns) outside Lima. In addition, most of the staff involved in the $25 million program continued to work with the bank. The bank gained significant experience in how to process different types of finance and how to deal with a new constituent group.
- In Nicaragua, the housing bank's capacity to execute home improvement activities and the social welfare agency's ability to implement community development programs were strengthened through their roles as implementing agencies.
- In the Dominican Republic, following Hurricane David in 1979, the National Housing Institute (INVI) benefited. INVI's involvement in the emergency housing program helped it develop as an institution. According to Valdez, INVI evolved to point where it was able to convince the central government that funds from the PL480-Title I Program should be allocated for a rural home improvement program to be initiated by INVI.

At the same time, address corruption early on.

Krimgold describes disasters as corruption circuses. This is because while unprecedented amounts of money flow into a country, the normal rules of the game are often suspended. In the name of speed and efficiency, controls and monitoring systems often are placed on hold. This combination can open the door to all sorts of problems. He warns that it is very important to set up administrative structures and controls early on and to make sure they are monitored and that there is an enforcement mechanism in place. As a Salvadoran contractor observed, "We all learned an expensive lesson on this project, but it was worth it to eliminate corruption from the bidding." (DA)

USAID and other donors need to recognize the many, very human dynamics in which they and local counterparts are operating. One consultant suggests that "[a]n acceptable way must be found to insulate [host government project managers and implementers] from … pressures of corruption, conflict of interest. Steps must be taken … to maintain the integrity of the contracting process…" (DA)

Be aware of special circumstances of governmental repression.

Reconstruction programs can also strengthen capacities of municipal governments. But as the example of Guatemala illustrates, it is vital to understand the local environment. Following the Guatemalan earthquake in 1976, USAID implemented a variety of programs in the rural areas. Some of these were self-help housing programs and others aimed to strengthen the administration of local government. The project provided institutional development assistance to the Municipal Development Institute (INFOM) to hire personnel, procure equipment, and finance training and technical assistance. The support program concentrated on improving INFOM capacity in the areas of regional planning, evaluation, automatic data processing, and environmental impact planning.

While laudable, some of these efforts, which aimed to develop local human capacity, had devastating consequences. Following the departure of international experts, many of those who had

acquired leadership skills under the programs were identified and later executed by the army. (Krimgold)

3.4.3.2 NGOs/PVOs

Work through the non-profit sector and NGOs.

Non-profit organizations can provide valuable insights, knowledge, and capabilities to outside donors, and they can use their experience to deepen their own abilities. The NGO/PVO community offers particular benefits to reconstruction efforts. Valdez notes the following.

- PVOs normally represent a particular organized constituency or they have the capacity to organize particular communities and raise private funds for development activities. This organizational capacity provides economies of scale in reaching dispersed and individualized target populations. Related cost-effective measures include low overhead rates, indigenous personnel, and efficient use of existing resources.
- PVO programming methods enable PVOs to ascertain client group needs so they can facilitate their participation in program planning and execution.
- Many PVOs are particularly specialized in the logistics of transporting, storing, and delivery of products to the target group and in the accounting and control of the process.

Similarly, in El Salvador, working through PVOs proved particularly beneficial. “As need for grant housing for earthquake victims of the lowest income levels became better defined, greater use of PVOs on self-help housing provided more housing for more low-income people than was originally contemplated.” (DA)

Reconstruction also provides the opportunities for PVOs to develop skills to become viable organizations. In El Salvador, Habitat Foundation developed into a successful service provider in the housing area as a result of the experience it gained during reconstruction. In the Dominican Republic, the personnel of several PVOs acquired abilities to plan and develop self-help housing programs, prepare budgets, procure large amounts of materials, and implement warehousing and accounting systems.

A specific example in the Dominican Republic was the creation of the Inter-Institutional Housing Commission (CII-Viviendas), a PVO that was formed to coordinate reconstruction efforts; share information; and focus on the long-term housing needs of low-income, rural families. As a result of its experience in reconstruction, CII-Viviendas developed into a formal institution, with the responsibility for:

- discussing and establishing mechanisms that are responsive to the demand for low-income housing;
- developing integrated housing programs linked wherever possible to productive educational and community development activities; and
- developing and sharing information on funding, technology, and procedures and methodologies that are relevant to the above functions. (Valdez)

The success of CII-Viviendas, in turn, can be measured by the creation of two small private enterprises. USAID's coordinating efforts among INVI, CII-Viviendas, and the Dominican Development Foundation (DDF) provided linkages to the AID-financed Micro-Business Program. Two small private enterprises, a block production center and a carpentry shop, are direct outgrowths of the Emergency Housing Program. The program evaluation predicted that the two enterprises "will qualify for small loans from the DDF, which will enable them to expand their operations and create new jobs in the community." (Valdez)

3.4.3.3 Productive Private Sector

Use the local private sector.

Reconstruction provides many opportunities for local architects, engineers, construction firms, city planners, entrepreneurs, bankers, and a host of other professionals to develop their skills and to earn a living.

In a 1993 evaluation of the El Salvador Earthquake Reconstruction Project, the consultant described the unanticipated skills building and institutional development that occurred in the Salvadoran private sector. Reconstruction following the 1986 earthquake took place in the midst of the country's civil war, and U.S. construction firm and other contractors demonstrated little interest in participating in the reconstruction process. As a result, Salvadoran professionals gained:

- increased construction management capability (in the Directorate General of Reconstruction);
- improved capacity and capability of Salvadoran engineering and construction firms; and
- increased technical skills in management and the use of computers in engineering design, construction scheduling, and financial controls.

In Panama, "Private builders constructed 1,205 new homes in a wide range of projects with prices starting at $6,500 to over $12,000 … The builders selected their own sites and then developed plans [that] they presented to the eligible families … They also constructed model houses and arranged for bus tours to the sites." (Dean)

In Jamaica, following Hurricane Gilbert, USAID successfully encouraged government officials to rely on the private sector to distribute roofing materials.

3.4.3.4 Beneficiaries

Don't confuse reconstruction with relief.

During relief, the poor face desperate situations. Their lives may hang in the balance. They need water, food, and health care, and they need these provisions quickly and without cost. During relief, victims are truly victims. During reconstruction, they need not be.

Reconstruction differs from relief. Reconstruction can take years. A solid reconstruction program will recognize that while the resources of the poor may be limited, and certainly will not come close to those of the formal private sector, their humble means should not mean that they should be treated

as if they had no resources at all. What they possess are far, far fewer resources. Programs need to be designed so that the poor can participate on commercial, if discounted and affordable, terms.

Avoid charity.

The literature is universal in this message. Free aid is counterproductive. It leads to dependency, raises false expectations, and fosters unproductive behavior.

As noted above, a key issue under debate in Guatemala following the 1976 earthquake was the question of free distribution vs. sales of reconstruction materials. While USAID and other donors debated the merits of each approach, it is interesting to observe that most local leaders were against giving away material. They felt that such an approach would encourage people to delay rebuilding, make normally self-reliant people view themselves as charity cases, and raise expectations for more free materials. USAID decided to pursue a subsidized credit system in which the proceeds to be used for labor-intensive projects were selected by the communities themselves.

Use self-help and community development methodologies.

Just as reconstruction in El Salvador and Panama provided local contractors in the formal sector with experience in improved construction methods, reconstruction in the Dominican Republic following Hurricane David yielded a similar result with the informal sector. According to Valdez, many local craftsmen gained both employment and increased knowledge and experience in constructing wind-resistant shelter solutions.

One of the most successful self-help housing projects took place in Popayan, Colombia following the 1983 earthquake. The project included a significant training component. A U.S. contractor, INTERTECT, and a Colombian training organization, SENA, carried out the project. Its objective was "to design and conduct a program of housing education focused on introducing appropriate technology in housing repair and reinforcement."

Community members were free to build houses of their own design and to choose from a variety of materials, as long as they followed seismic-resistant construction principles. The training program also offered more formal courses in plumbing, masonry, framework, bricklaying, reinforced concrete, etc.

The project produced a variety of simple training aids relevant to earthquake situations, including booklets on "How to Repair Typical Damages," "How to Repair an Adobe House," and "How to Repair a Brick House," among others.

Based on a participatory development model, the approach offered other added benefits. It:

- was the most economically feasible alternative for lower-income families, since it was labor-intensive and used locally available materials;
- trained community members in self-help construction techniques;
- trained individuals who could subsequently seek employment in the construction industry; and

- provided household members skills they could later use to repair or upgrade their homes.

Self-help projects can also strengthen community development. According to Gersony, "Housing reconstruction and rehabilitation can be looked upon as activities into which community participation can be integrated, and through which community organization can be created and strengthened."

Berke and Beatley note that, "Disaster specialists increasingly emphasize that the recovery period offers an opportunity to strengthen local organizational capacity to facilitate long-term social, economic and physical development. Under this approach external aid can be used to build and support local organizations to be more effective in carrying out sustainable development initiatives that endure long after the disaster. Such initiatives not only mitigate damage … they also reinforce local capacity to resolve … problems … This approach assumes that aid recipients become active participants rather than helpless victims."

The same authors conclude, moreover, that top-down delivery programs are not effective and

> were almost always unable to deliver aid that matched local needs and that built on local capacity to undertake self-directed recovery initiatives. As such, they could not address long-term development needs, which involved a complex relationship between people and their social, physical, and economic environment. Because they ignored the enormous range and variety of local needs and priorities, even well-intended programs were often counterproductive. (Berke, Beatley)

Use a bottom-up approach.

In their research on four Caribbean disasters, Berke and Beatley conclude that a bottom-up, community-based approach to recovery often will be "more effective and equitable than the traditional top-down approach … Because community-based NGOs are deeply rooted in the society and culture of a locality, they enable people to express their real needs and priorities, allowing problems to be correctly defined and responsive aid and development programs to be designed."

They explain that the most interesting bottom-up approaches were those in which external organizational efforts supported and complemented community-based NGO activities through devolution of power and resources to the local level (Berke, Beatley).

3.4.4 Shelter Considerations

3.4.4.1 Housing Building Materials

Utilize appropriate materials and technology.

There is no "one size fits all" solution. Disasters differ. Materials and technology that are earthquake resistant differ from those that mitigate against storm damage. Urban construction requirements differ from rural housing needs.

Moreover, the choice of materials and technology needs to be sensible and based on an assessment of likely future events. According to Krimgold, "we do not need to rebuild Honduras to survive the next Mitch," but rather to rebuild so that we can mitigate against the damage caused by lower-intensity, but more frequent and predictable events. He asserts that "the bar need not be so high," but it does need to be appropriate.

According to Steve Stichter, OAS, "minor changes in building practices can make a big difference as to whether a house remains standing." In the case of hurricane mitigation in the Caribbean, he cites three basic rules:

- use the right gauge roof;
- use hurricane straps or a version thereof; and
- make sure walls are tied to the foundation.

Stichter noted that in Dominica, following Hurricane Marilyn, the only houses that remained standing were those that had incorporated the above building techniques.

Citing the experience of Hurricane Gilbert in Jamaica (1988), Dunham also explains the important of roof clips and of making sure houses are tied to foundations. He cautions, however, that donors, in their attempts to improve construction, can sometimes make things worse. Locals construct homes in a certain way due to prior experience with disasters. He offers two interesting examples.

- Verandas on Jamaican homes are not connected to the main roof. Rather than a shortcoming, he notes this is a wise practice, since in a storm this often means the veranda is lost, but the roof remains.
- Large overhangs are not common in Jamaican homes. While they might afford protection against the sun's heat, they also make the structure more vulnerable in a hurricane's winds.

Cuny, Davis, and Krimgold explain the importance of the roof.

> The key to solving structural problems in emergency shelters and improved permanent housing is linked to providing an adequate roof. The majority of problems encountered … are related to the problem of finding adequate roofing material … the performance of a structure in high winds or in an earthquake is dependent upon the weight and design of the roof, and how it is attached to the frame. Once these problems have been solved, it is almost inconsequential what type of infill is used in the walls.

In earthquakes in Peru (1970), Guatemala (1976), and Colombia (1983), many fatalities were caused by the weight of tile roofs that fell and crushed people. Tile roofs have since been replaced in many locales by corrugated, zinc sheets. This material is lighter, safer, durable, waterproof, and for the most part culturally acceptable to users. Among the complaints are that it is noisy during rainstorms and lacks the insulating properties of tile. Nevertheless, the dangers posed by tile roofs have been so apparent that people have readily accepted the safer, lighter zinc sheets.

The approach in Popayan, Colombia encompassed rebuilding walls, reinforcing roofs, anchoring roofs, using lightweight materials for construction and roofs, improving bracing and the design of trusses, and lowering the total height of walls more than 2.5 meters.

A positive outgrowth of the emergency housing programs that were implemented between 1979 and 1982 in the Dominican Republic was an increased awareness of and interest in the application of appropriate technology in housing activities. “The creation of the Center for Appropriate Technology in Popular Housing (CETAVIP) was a significant development that should have a lasting impact on future shelter activities in the Dominican Republic.” (Valdez)

3.4.4.2 Housing Finance Considerations

Facilitate more equitable access to housing finance.

The housing finance market in Latin America is underdeveloped and inadequate. Even in Panama, which has the most developed banking sector in Central America, this was a constraint during reconstruction of El Chorrillo. Initially, there was no provision for using grant funds for construction financing. It was assumed that the private builders would obtain their own financing from local banks. This worked fine for the larger builders, but the lack of financing caused delays for the smaller builders. USAID grant documents were amended in August 1990 to allow construction financing. According to the author, the lesson learned is that project funds should be available for construction financing from the start in an emergency housing program. (Dean)

The Panama reconstruction experience afforded the national savings bank of Panama experience it had not had before. Dean explains, that:

> [t]he Caja de Ahorros is the national savings bank of Panama. Although it is in the public sector, it operates independently and functions more like a private sector institution. The Caja has over 30 years’ experience in providing credit for housing. However most of its work in the past has been with middle and upper income levels. This was their first experience with a large scale project to help very poor people.

Provide home improvement loans that have a mitigation focus.

Stichter explains that most OAS experience in housing finance is through revolving loan programs carried out through national development agencies. The loans are geared to the low-income community for home improvement.

Generating demand among homeowners is a key constraint, Stichter notes. There is little demand among the poor to take out a loan for disaster mitigation purposes alone, so the home improvement loans endeavor to incorporate mitigation and safety as part of the improvement package.

One experience that differs is the Caribbean Development Bank (CDB) in Belize, which operates a successful program through credit unions. The OAS is working with the CDB to make sure that financing reaches lenders at a rate where they can cover their costs without resulting in interest rates and a loan that is beyond the reach of the low-income target community.

3.5 Reconstruction and Sustainable Development

> In the late 1970s … some disturbing trends began to emerge. Countries experiencing rapid development suddenly lost momentum when disasters struck. Resources for development often became scarce when they were siphoned off for recovery and reconstruction. At first, it was assumed that more disaster relief from developed countries was needed. In response, annual worldwide relief appropriations grew dramatically through the 1980s (World Bank 1990). Nevertheless, human and economic losses expanded dramatically during the same period. Why? The basic problem was *the conceptual failure of both emergency and development organizations to link disasters and sustainable development*. Emergency relief organizations do not address the underlying problem of disaster vulnerability in poor countries, nor do they deal with resolving problems of underdevelopment. Development agencies do not account for hazards in project investment decisions (World Bank 1990)." (Berke, Beatley) (italics added)

3.5.1 Anticipating and Preparing for the Next Disaster

Foster a dynamic urban planning process.

The quality of reconstruction will depend a great deal on predisaster planning. Several experts noted that if a city or municipal development plan exists, then local officials and international donors will have something to work with when a disaster strikes. Ideally, local authorities and leaders have developed a plan or have a sense as to how a town or city should grow and where new construction should go, including new plants, factories, and residential neighborhoods. Similarly, they will know where growth should not take place, where damage is most likely to occur, and where populations will need to be located in case of a disaster.

Make disaster plans relevant.

Despite the frequency of disasters, planning for them remains inadequate. Berke and Beatley found that, at best, disaster plans focus on immediate concerns — preparedness and emergency response plans. The authors recommend that disaster programs also encompass a longer-term view — to explicitly address recovery and reconstruction. They contend that post-disaster activities provide opportunities "… for building in safer ways and in safer locations, and disaster plans could start to identify such opportunities in advance. A disaster plan should also be seen as a long-term process of dealing with natural disasters and not as a static end-product."

Incorporate disaster mitigation into the reconstruction program.

> Natural disasters cannot be prevented but their impact and severity can be lessened or mitigated. Mitigation can reduce the injury and destruction that such disasters inflict on human lives, the built environment, and the general economy. Disaster mitigation differs from, but is complementary to, disaster responses and relief efforts. (PADCO)

Disasters take their toll. The question is whether costs are incurred before or after the disaster. Either way, a financial cost is incurred. The price paid in human lives and human suffering cannot be measured.

Reconstruction plans need to address the factors that put people at risk in the first place and to make sure that these factors do not repeat themselves. At the household level, this means educating people as to why their houses washed away in a flood or why they fell during an earthquake, and where or how they could be rebuilt to reduce that risk in the future. According to Krimgold, if people understand what to do, why a new technology or method might be safer, then, if the measures are affordable and implementable, they will be followed. But, he contends, most people are unaware of the risks they confront. This is due not just to lack of education, but also to migration and lack of experience or exposure to earlier disasters. People can move to a floodplain and not realize where they are until a disaster strikes, and it might take years for that to happen. If there is no memory of a prior disaster, there is no reason to think that there might be one in the future. Two examples are illustrative.

- "Prior to Hurricane Gilbert, Jamaica had not experienced a direct hit from a hurricane in more than thirty-five years." (Berke, Beatley)
- St. Kitts/Nevis suffered severe damage from Hurricane Hugo in 1989. Over the past 200 years, they have experienced tropical storms roughly every 20 years. However, they had not experienced a severe hurricane since 1928.

Mitigation includes structural design.

Mitigation has both structural and non-structural elements. According to PADCO, structural mitigation involves the construction of devices, such as sea walls and bulkheads, and of drainage ways, culverts, and bridges that permit floodwater to dissipate without inflicting damage. It also includes using construction techniques and practices to construct buildings to withstand heavy wind and water.

As Krimgold, Kellenberg, and Boardman note, post-disaster reconstruction provides an excellent opportunity for the incorporation of disaster mitigation measures in sites and design of structures and infrastructure. The provision of donor resources for reconstruction should provide adequate leverage to ensure the incorporation of appropriate mitigation measures in the aftermath of a disaster, and the local public officials and business leaders should be adequately aware of disaster-related loss potential to support a mitigation initiative.

Mitigation also includes public policy, risk management, and planning.

"Non-structural mitigation refers to public policy, usually risk management, that influences the type, location, and density of development — guiding it so that it occurs in less hazardous areas." (PADCO)

At the community or municipal level, disaster mitigation and prevention efforts should be an integral part of an urban planning process. When potential disasters and their consequences are addressed up front, they allow for thoughtful analysis and decision making. Community leaders, entrepreneurs,

potential investors, and local officials can decide where, when, and how to spend resources in ways that facilitate long-term, sustainable growth. They can help ensure that the city grows away from the fault line and that neighborhoods develop far from the floodplain.

Complementary approaches to mitigation should be adopted.

Mitigation includes the following complementary approaches.

- *Strengthening the housing stock, both in new construction and retrofitting existing stock.* This must include strategies appropriate to both the formal and informal sectors. Developing and enforcing codes will strengthen practices in the formal sector. But since much construction takes place in the informal sector, information dissemination is needed. (Berke, Beatley)
- *Sustainable land use patterns.* There needs to be greater attention to land use planning, preparing accurate maps of hazard zones, training planners, and strengthening land use and town planning laws. Similarly, these formal approaches must be supplement by those that will reach the informal sector, most likely through community-based organizations. (Berke, Beatley)
- *Environmental protection and natural mitigation.* Disaster planning can and should be integrated with environmental management and protection. The exposure of people and property to natural disasters is greater as a result of environmental degradation, and many features of the natural environment serve important mitigation functions. (Berke, Beatley)
- *Risk mapping and GIS services.*
- *"Lifeline" programs for critical facilities.*
- *Promotion and training to professionals, developers, builders, and community groups.*
- *Evaluation, testing, and revision of building codes; integration with measures to improve insurance underwriting; and improved siting.*
- *Market analysis and promotion of improved building technology and materials.* (PADCO)

Mitigation policies need to be realistic.

There are both physical and economic limits to what is possible. Examples from the Caribbean and Peru are sobering.

- The Berke and Beatley study warns that "Caribbean island nations currently have a limited capability to influence the quality and location of development and growth. Many structures and entire communities are located in high-risk locations, and few opportunities to relocate or prevent rebuilding in these risky areas were taken advantage of in the aftermath of the hurricanes of the late 1980s."
- Poverty also plays a role. The Housing Ministry estimated in 1979 that 60 percent of the Lima population lived in structures that did not meet basic seismic-resistant guidelines. Costs were the main constraint for low-income families who might wish to incorporate seismic-resistant features in their buildings. Prices for all levels of materials, including roofing, cement, and wire, were out of reach for many individuals.

In many places throughout Latin America and the Caribbean, building codes and land use restrictions exist, they simply are not enforced. Berke and Beatley note that a national building code

is in place in Jamaica, but is largely unenforced. Similarly, there are restrictions for development in vulnerable locations. Yet low-income and squatter communities lie in high-hazard floodplains and gullies and areas prone to landsliding. "In theory, development activities (and the location of development) are controlled through the Jamaica Town and Country Planning Act … In reality, much of the building and development that occurs is not regulated and occurs through the country's large informal housing and building sector." (Berke, Beatley)

If safety concerns are not sufficient to encourage better planning, then perhaps market forces will be. PADCO observes that one "… indication of the need for disaster mitigation to reduce further risk is the withdrawal of re-insurance companies from the Caribbean because of the level of disaster-induced damage … The impact and effect of disasters, especially for formal sector construction, can be mitigated through better pricing of insurance risk. Therefore, mitigation policy is as much driven by the private sector as it is by a land use and building codes regulatory framework established by public policy. More precise pricing policies by insurers should have an impact on building and siting decisions."

Unfortunately, it is likely that the severity of disasters will be greater in the future. This is due in part to natural causes (such as El Niño) and in part to population growth, urban migration, and land degradation. National governments and international donor agencies all have a responsibility to incorporate disaster mitigation strategies into their development planning programs.

Help create a "culture of safety."

Public safety and disaster mitigation work only if people understand the issues. To be successful, such programs require significant public information campaigns.

"Greater use of improved building technology and materials will require training and information dissemination. It will also require support for marketing of certain devices, such as hurricane straps." (PADCO)

"Professionals involved in sectoral planning … should be trained in specific hazard assessment to fortify their understanding of the use of hazard information in sector policy, programs, and investment projects." (Bender)

3.5.2 Reconstruction and Economic Development

> The successful implementation of disaster mitigation measures is an important aspect of national development as it provides a means of protecting national assets. Mitigation also serves to reduce the impact of natural disasters and hence the reliance on external assistance. (USAID Concept Paper)

Seek change while memories are fresh.

Disaster mitigation and economic development are inextricably linked. Disaster mitigation should be part of the reconstruction and development process. Bad memories fade quickly. This is true for people at all levels of society. For those who bear the brunt of the disaster, the urge to rebuild their homes with improved technologies will fade quickly. Similarly, for policy makers, the formal

construction sector, and community leaders, willingness to make changes that will improve public safety will diminish the more distant becomes the memory.

This is human nature. Other crises and realities will arise and take their place. But it is in the interests of both future disaster victims, recipient countries, and donor agencies to focus increased attention on disaster mitigation. Disasters have a decidedly negative impact on a country's potential for economic growth, and disaster response has become an increasingly large proportion of development assistance dollars. In essence, this means fewer dollars for other initiatives. Stephen Bender explains.

> Disasters caused by hazardous events … are consuming an ever larger portion of development resources. Increasingly the "development agenda" is being set by these disasters, yet in Latin America, as least, they are rarely discussed in terms of their causes and susceptibility to mitigation through development effort.
>
> For international agencies … disaster assistance becomes a major component of development assistance. For Latin America and the Caribbean countries in the last 30 years, a total of US$75 billion in development assistance is juxtaposed against an accumulated total of US$32 billion in declared disaster losses.
>
> The disaster can create further dependency in the case of a "developing country," causing loss of hard-earned development gains, and can lower, for a generation or more, the capacity to sustain the desired increase in betterment. In only the rarest of instances does a post-disaster reconstruction program provide sufficient resources to regain the development momentum.

Given this, USAID and other donors should take advantage of the narrow window that occurs in the weeks and months following the disaster to press for change. The urgency of change will fade as people begin to forget the horror, and USAID and other donors should make disaster mitigation an integral part of development program planning.

Use the reconstruction process to build institutional capacity.

The primary goal of shelter reconstruction is to help people rebuild or obtain a safer, more disaster-resistant home. In the process of doing so, reconstruction operations render secondary benefits. They provide almost unprecedented opportunities for local agencies, organizations, and institutions to gain valuable experience.

Use the reconstruction process and accompanying resources to jump-start economic development.

Krimgold notes that "disasters are not all bad." Their impact merely amplifies pre-existing conditions. If a country was in trouble before a disaster, the event will exacerbate the situation. If, however, a country was moving in the right direction, the outside capital, information, and technology that flows in during reconstruction can improve things. If local authorities and the

business community use these resources wisely, they can actually make things better. Krimgold contends that when a reconstruction program is well organized, it can lead to accelerated change, development, and growth. For example, it can foster new expansion while getting rid of obsolete plants. It can replace outdated or worn-down buildings with newer, safer ones.

But be realistic.

While the influx of capital into a healthy system might accelerate growth, in a closed or corrupt environment, the influx of capital will exacerbate pre-existing unhealthy conditions.

Cuny, Davis, and Krimgold note that "[m]any organizations view a disaster as an opportunity to create or promote change … But these opportunities are much more limited than is currently believed … After a disaster, people simply want to get back to normal as quickly as possible. If change is to be effected during this period, it must be evolutionary and appropriate to the constraints previously existing within the society."

The cost of reconstruction will far exceed total donor contributions.

Examples from the Caribbean are sobering. PADCO's study reveals the following.

- Hurricanes David and Frederick caused about $800 million in physical damage to homes and infrastructure and left 100,000 families homeless.
- Economically, the damage caused by Hurricane Hugo was more than five times the annual GDP of Montserrat.
- In Jamaica, the estimated economic loss was approximately $1 billion, yet Jamaica received just over $100 million in international assistance (as a result of Hurricane Gilbert). In Haiti, Gilbert caused an estimated $92 million damage. A total of $3.3 million in international assistance was provided. In both cases only 10 and 3 percent, respectively, of the total cost of the disaster was offset by outside financial assistance. In general, international assistance to countries following a disaster is only a fraction of the total physical and economic loss inflicted. As a result, scarce national resources that could otherwise be spent for development purposes must be used for reconstruction.

3.5.3 Replication and Dissemination

Maintain an institutional memory.

USAID should assemble and maintain a small collection of key documents to have on hand as references for future disasters. They can be organized by types of disaster and then by date and should include final evaluations, audits, and manuals.

USAID should maintain a small database of specialists, including their phone numbers or e-mail, as well as an indication of the disaster reconstruction effort experiences they have. Some specialists work on hurricane recovery while others are experienced with earthquakes.

Disseminate knowledge.

Inform overseas housing offices of this resource. Provide them with copies of the documents or direct them to the USAID Development Experience Clearinghouse facility in Virginia. An easy search can be conducted on-line at the facility as well as via CD-ROM, available from the Clearinghouse, and attached to this report.

Convene regular meetings on disaster mitigation and reconstruction. A spring meeting could examine hurricane issues, for example, while a fall meeting could look at earthquake responses. Disseminate a short report on the meeting that captures key recommendations and/or findings. Organize informal brown bag lunches when specialists are in town following an overseas reconstruction effort. Prepare informal notes on the brown bag lunches and send by e-mail to overseas housing officers.

Two recommendations from the Colombian, Popayan earthquake experience in 1983 are worthy of consideration.

- Disseminate lessons learned. The authors recommend that USAID/OFDA might want to consider putting together packets of post-disaster information that could be distributed along with initial emergency assistance. This information might include training aids from previous disasters in the same region of the world.
- The SENA reconstruction program could be an excellent model for other post-disaster programs. OFDA might want to prepare a case study of the experience for dissemination.

Examine cross-cutting issues.

- *Finance.* All housing projects require finance. Examine USAID's experience with a variety of housing finance mechanisms. This should include urban and rural requirements experience through formal financial institutions, both government and private, as well as through smaller entities, such as cooperatives, credit unions, and community organizations. The microcredit model should be examined for possible replicability. The study should encompass the needs of formal contractors as well as those in the informal, self-help area.
- *Formal vs. informal sector.* How shelter is financed as well as how it is designed and constructed will differ depending on who is building and who is paying. Construction techniques for large urban centers are not the same as for small rural homes. Just as the content of the "safe building" message will differ for each sector, so will its means of delivery. One will be more affected by public policy, the other by an understanding that a method might save his family's life.

To the extent possible, use recent experience. The exceptions would be the Nicaragua and Peruvian large HG programs. Although the Nicaragua experience is dated, it is still a model worth exploring.